

Ecosystem Services – How do farmers envision a payment system working for them

2019 NORTHERN TIER DAIRY SUMMIT
April 1-2, 2019
Jay Peak Resort
Jay, Vermont

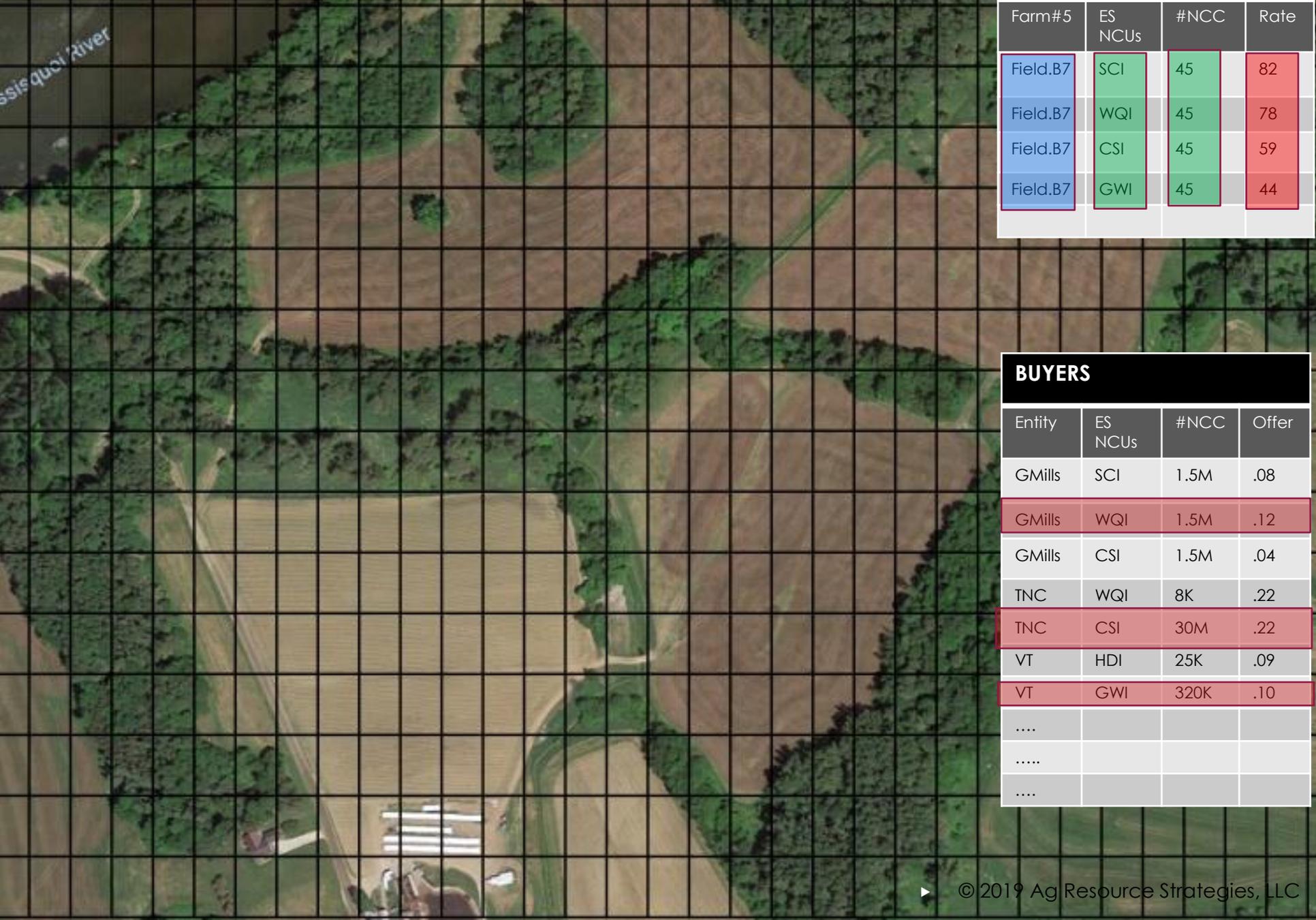
Tim Gieseke, Ag Resource Strategies

Facilitator: Heather Darby, UVM Extension

Early Ecosystem Service Visionaries

1905: Hugh Hammond Bennett; erosion was a problem for rural economies

1934: Aldo Leopold's "Conservation Economics"; Reward the landowners who conserve the public interest

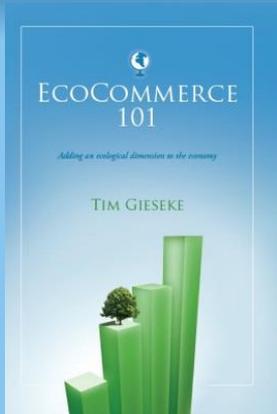


SELLER			
Farm#5	ES NCU	#NCC	Rate
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Field.B7	WQI	45	78
Field.B7	CSI	45	59
Field.B7	GW	45	44

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GMills	CSI	1.5M	.04
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VT	HDI	25K	.09
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....			
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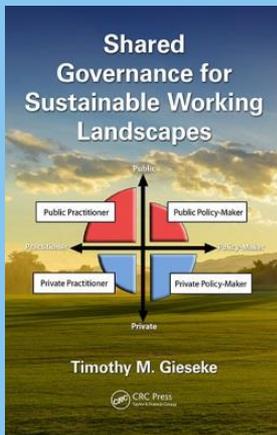
In this context,
the resource manager (farmer)
is the supplier to the market,
rather than a customer of a program.





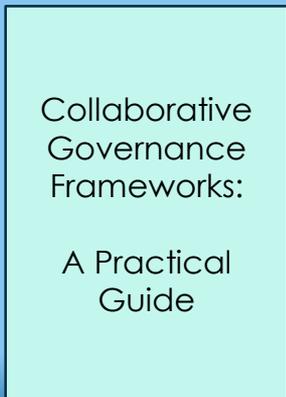
Adding an Ecological Dimension to the Economy (2011)

Economics
Public and Private Policy



Natural Capital and Ecosystem Services a part of our economic system (2016)

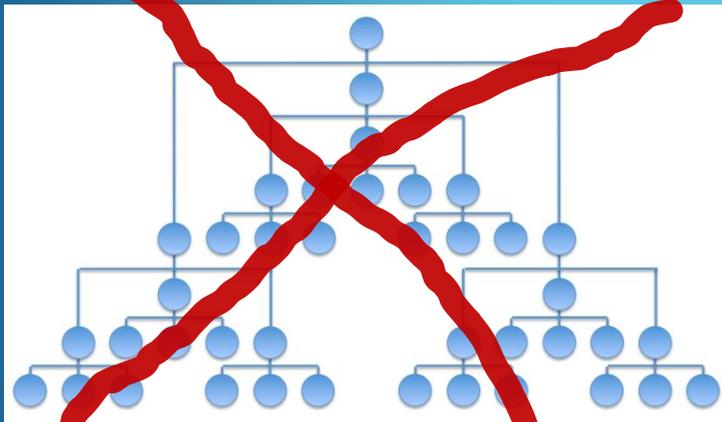
Platform &
Business Ecosystem



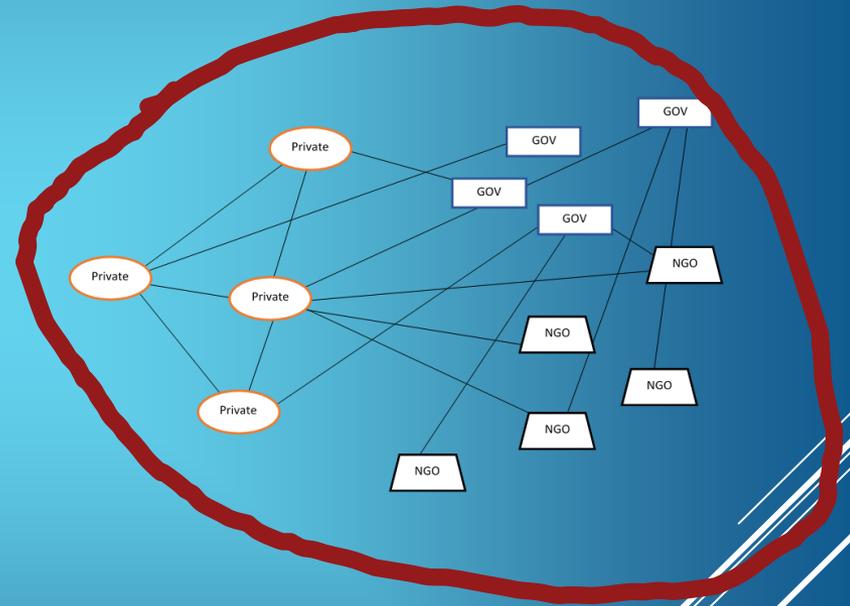
Describing and designing Governance Frameworks for common pool resource management (late 2019)

Collaborative/
Decentralized
Governance

EcoCommerce Governance

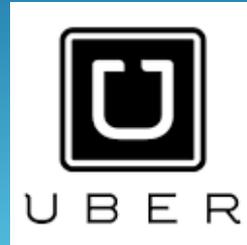


Top-Down Hierarchies



Network Governance

Networks have *fundamentally* changed Commerce



Brian Chesky 

@bchesky

Follow



Marriott wants to add 30,000 rooms this year.
We will add that in the next 2 weeks.

8:11 PM - 10 Jan 2014

EcoCommerce follows Economic Principles

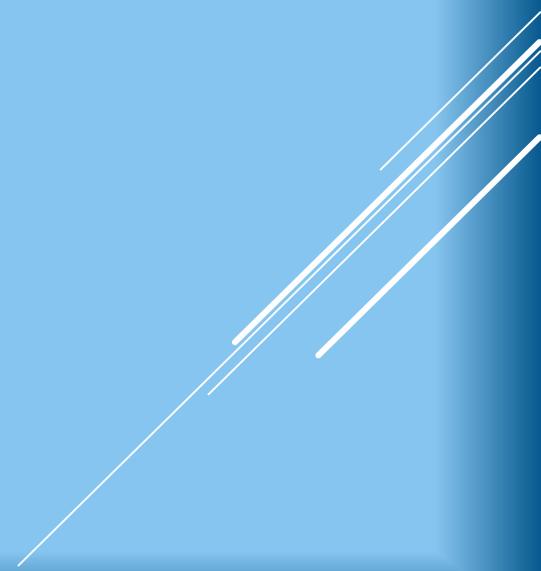
Demand and Supply Dynamics

Tradable Private Goods and Club Goods

Accounts for Transaction Costs

Connect Willing Buyers and Sellers

Self-Organizing Market

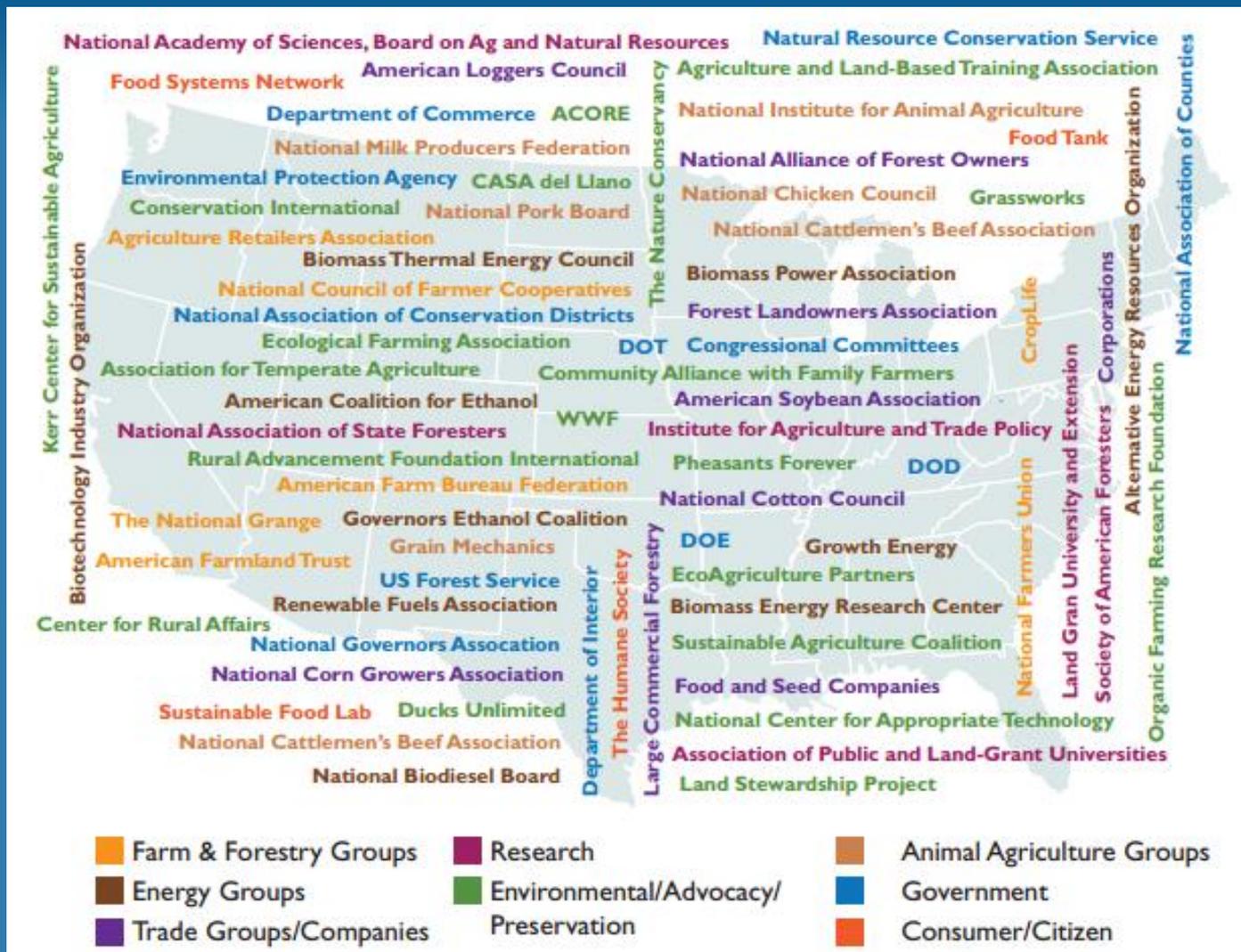
A decorative graphic consisting of several parallel white lines of varying lengths, slanted upwards from left to right, located in the bottom right corner of the slide.

“Demand” has increased over the decades



1930s-1970s

Agriculture Production and Conservation Stakeholders

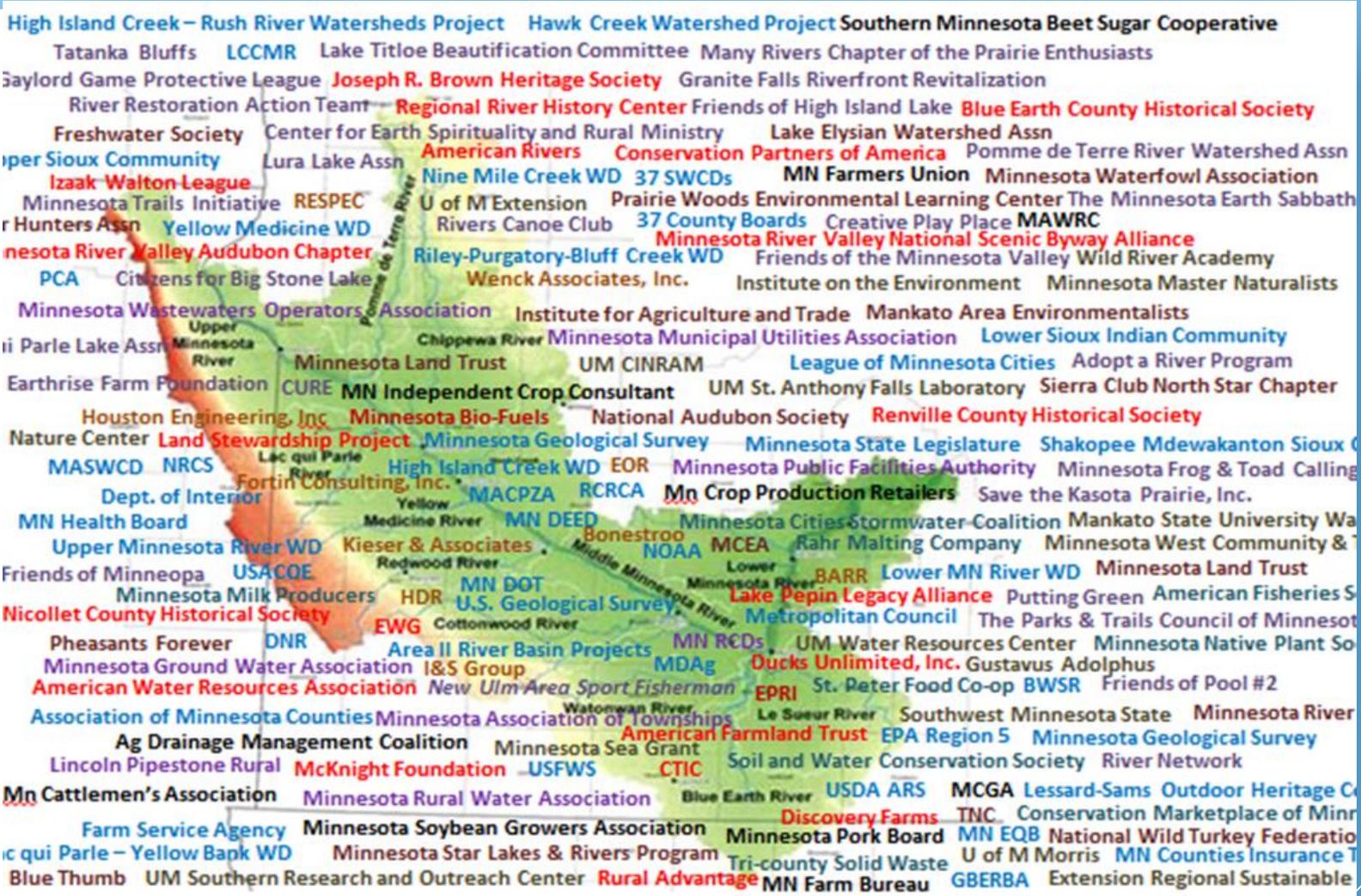


1980s - present

Agriculture Production, Conservation and Sustainability Stakeholders

A Local Example of Increasing Demand

2000s



Minnesota River Basin Stakeholders by Sectors and Organizations

Utilities/Assn	Energy	NGOs	Citizens Groups	Government
Consultants	Research	Trade/Industry	Agriculture Groups	Environmental & Conservation Groups



GENERAL MILLS AIMS TO DRIVE REGENERATIVE AGRICULTURE ON 1 MILLION ACRES BY 2030



GM'S SUSTAINABILITY OFFICER SAYS TRAINING, PROGRAMS WILL BOOST SOIL HEALTH AND ECONOMIC RESILIENCE.



By Bill Spiegel
3/4/2019



AMERICAN SUSTAINABLE BUSINESS COUNCIL



CONSERVATION FINANCE NETWORK

Sustainability [Demand] Programs often:

Are independently created

Have low, or no ecosystem service values

Have high transaction costs

Are not site specific to the benefits

Are not accountable to the ecological conditions

Sustainability [Demand] Programs Lack Context

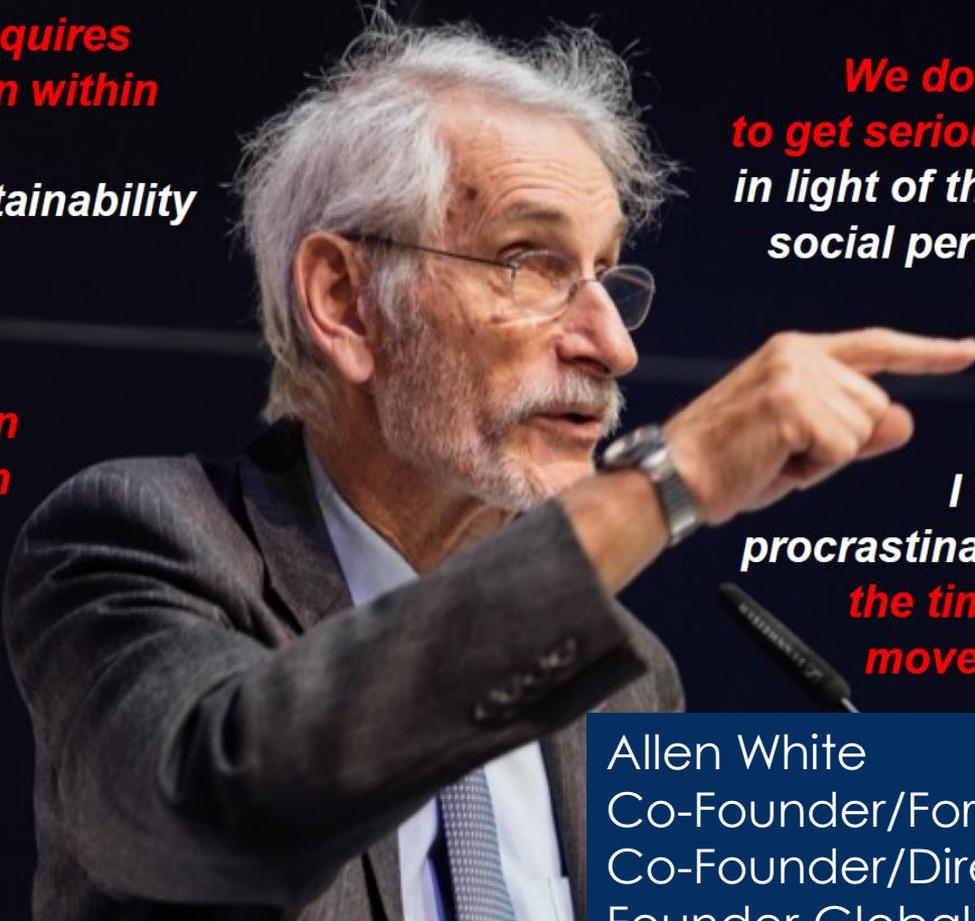
Sustainability requires contextualization within thresholds.

That's what sustainability is all about.

Yet to this day, contextualization rarely appears in sustainability reports.

We don't have decades to get serious about Context in light of the ecological and social perils that lie ahead.

I think the time for procrastination has passed; the time for aggressive movement is upon us.

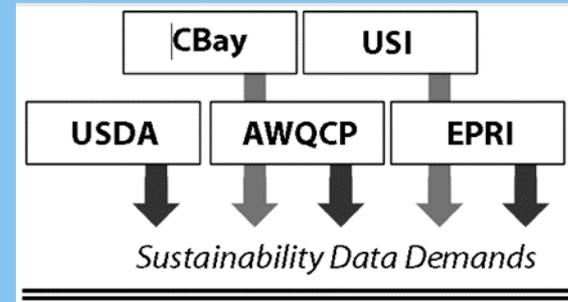
A photograph of Allen White, an older man with white hair and glasses, wearing a suit and tie. He is pointing his right hand towards the right side of the frame. The background is dark and out of focus.

Allen White
Co-Founder/Former CEO GRI
Co-Founder/Director Corp 20/20
Founder Global Initiative for
Sustainability Ratings

How did the movement get there?

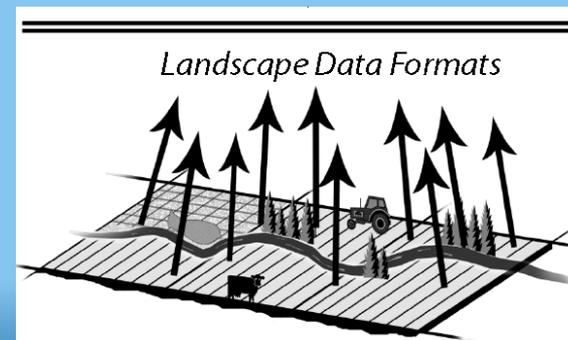
Carlson's Law:

"In today's environment of readily available technology...



...innovation from the top-down tends to be orderly and dumb and...

...innovation from the bottom-up tends to be chaotic and smart."



Carlson's Law in Sustainability Resulted in:

[High] Absolute Demand = Total Demand
regardless of the ability to pay

[Low] Effectual Demand = Demand that
carries sufficient resources to motivate
production

Market Outcomes:

Low and diffuse values, along with high and multiple transactions costs that do not create ecological intelligence or an economic valuation process

What is the Sustainability Demand Potential?

Demand is expected to increase

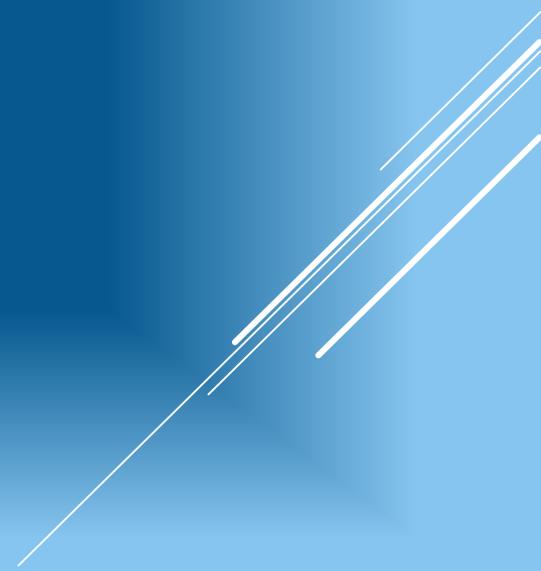
Corporations will move toward sustainability context

Aggregation of low values can create an effectual demand

Information technologies can reduce and share transaction costs



Questions on Ecosystem Service Demand?

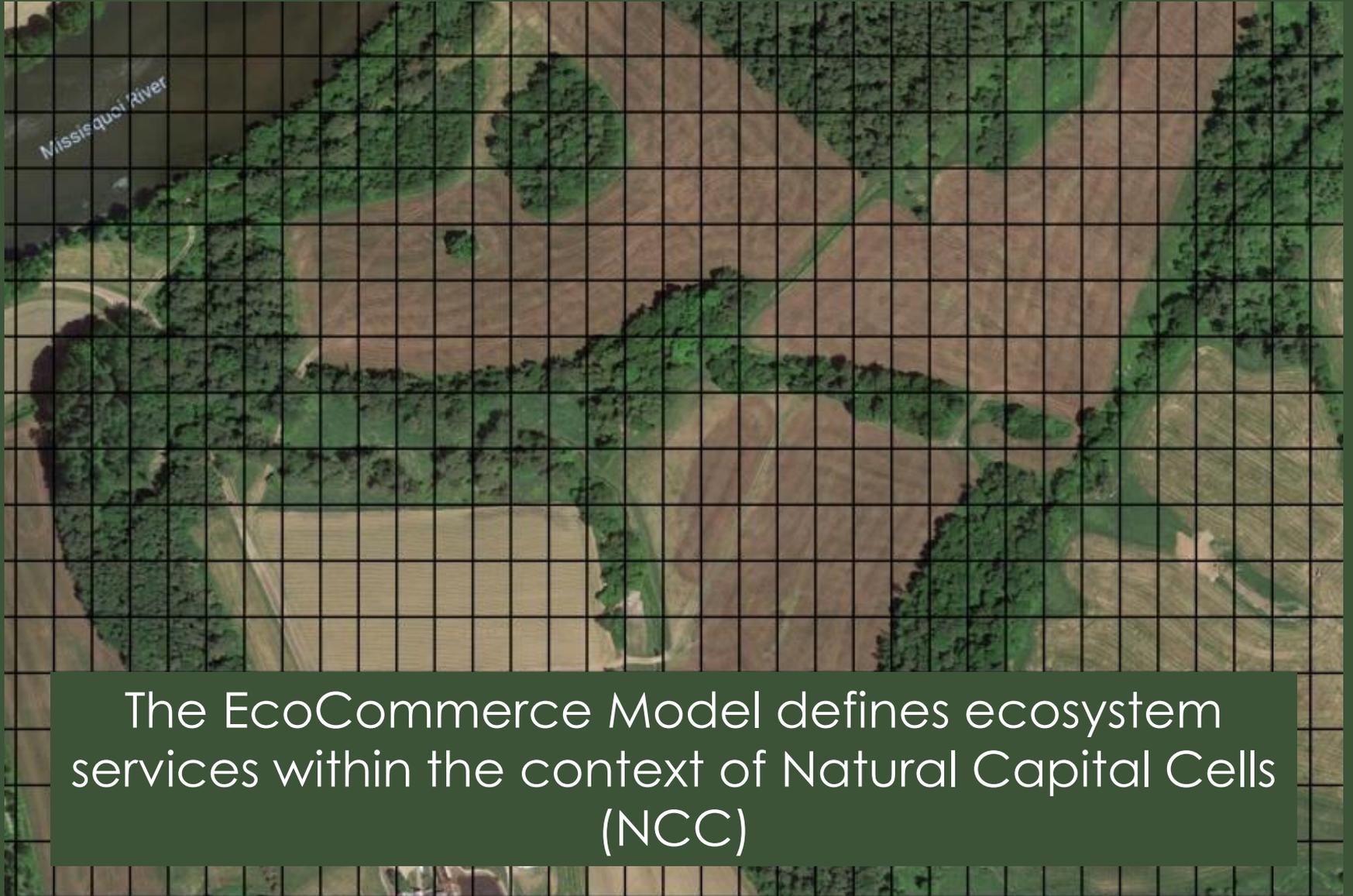


Defining Ecosystem Services Supply





Undefined, or Defined Nationally, Regionally, Locally,
Jurisdictionally, Geographically – by watershed, product-
shed, food-shed?



The EcoCommerce Model defines ecosystem services within the context of Natural Capital Cells (NCC)

Natural Capital is an Economic Capital

Financial Capital



Physical Capital



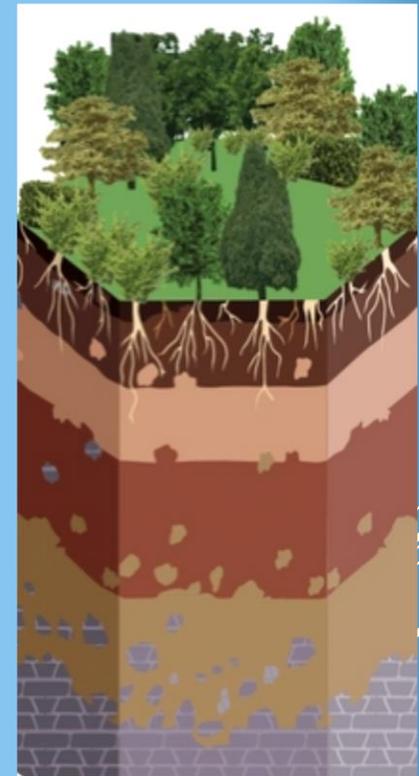
Human Capital



Social Capital



Natural Capital

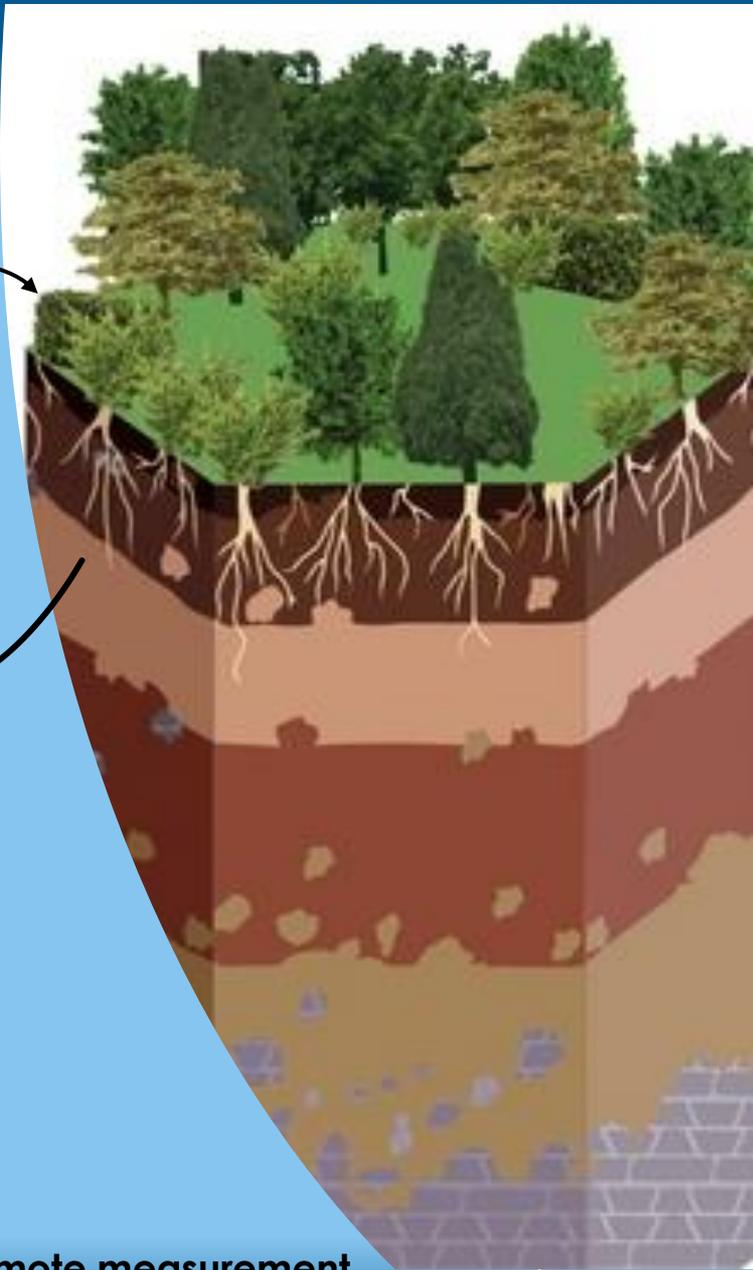


Natural Capital
[Natural Capital Cells]

Ecosystem Services
[Natural Capital Units*]

- Nutrient Cycling
- Water Storage
- Carbon Sequestration
- Biodiversity
- Soil Health
- Water Cleansing
- Pollination

***NCU – Index-based, direct measurement, remote measurement**



Each NCC has the capacity to generate a multitude of NCUs

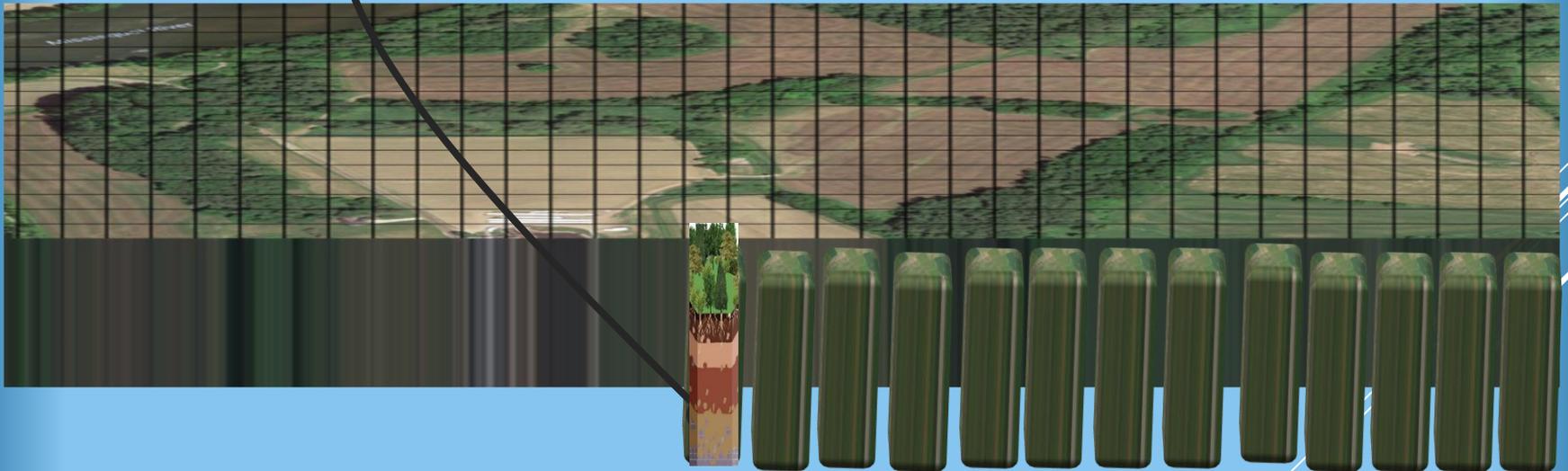


NCC



REM	58
WQI	62
SQI	75
CSI	42
HSI	24
GWQI	88

NCUs



The NCC-NCU provides context for Sustainability Demands

Natural Capital based

Geographically-identifiable

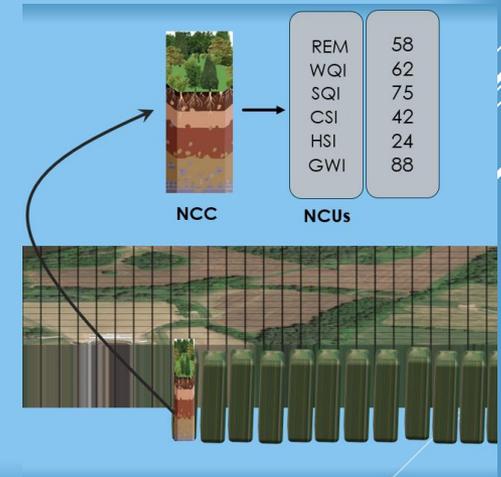
Stable unit, site-specific

Ecologically relatable

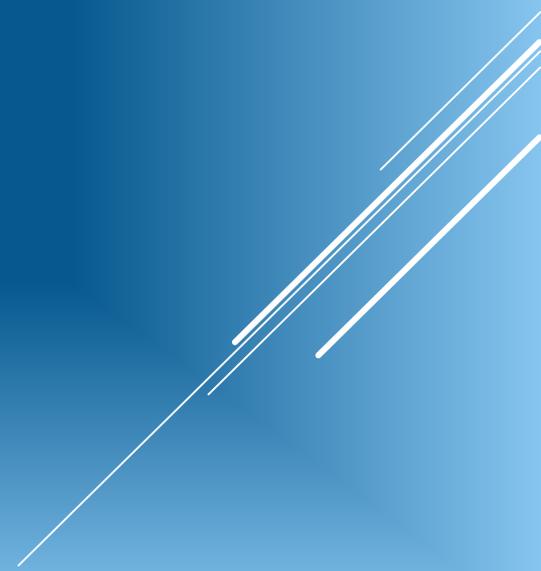
Customizable to Buyer

Aggregated in scopes and scales

Tradable Unit



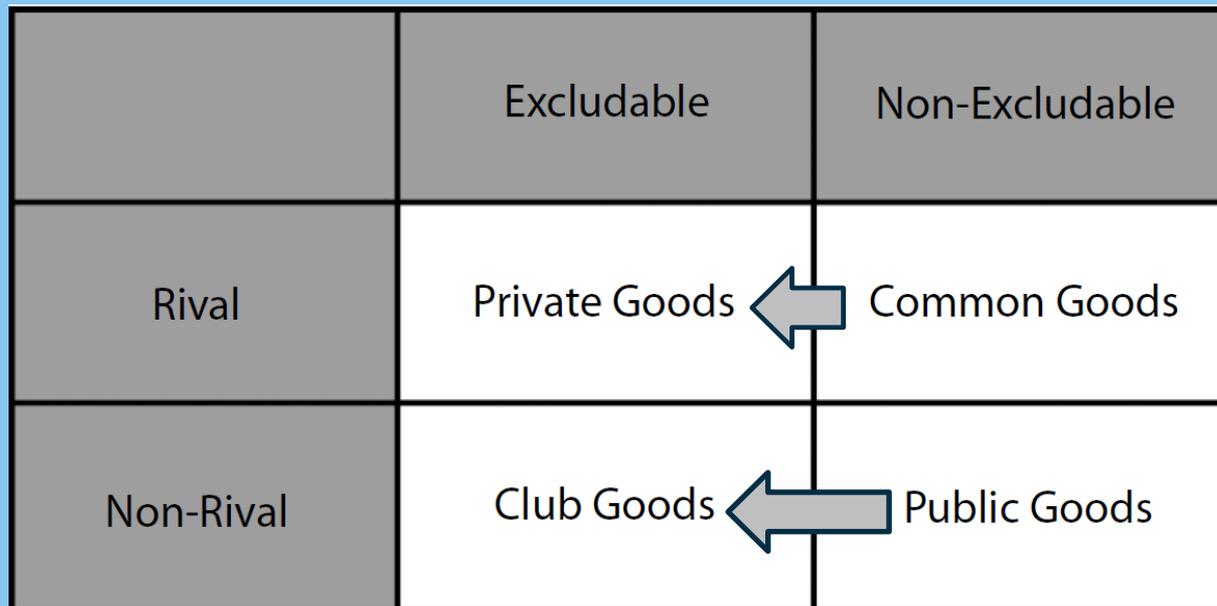
Questions on Ecosystem Service Supply?



NCU as a Tradable Private and Club Good

A **Good** is classified by its excludability and rival status

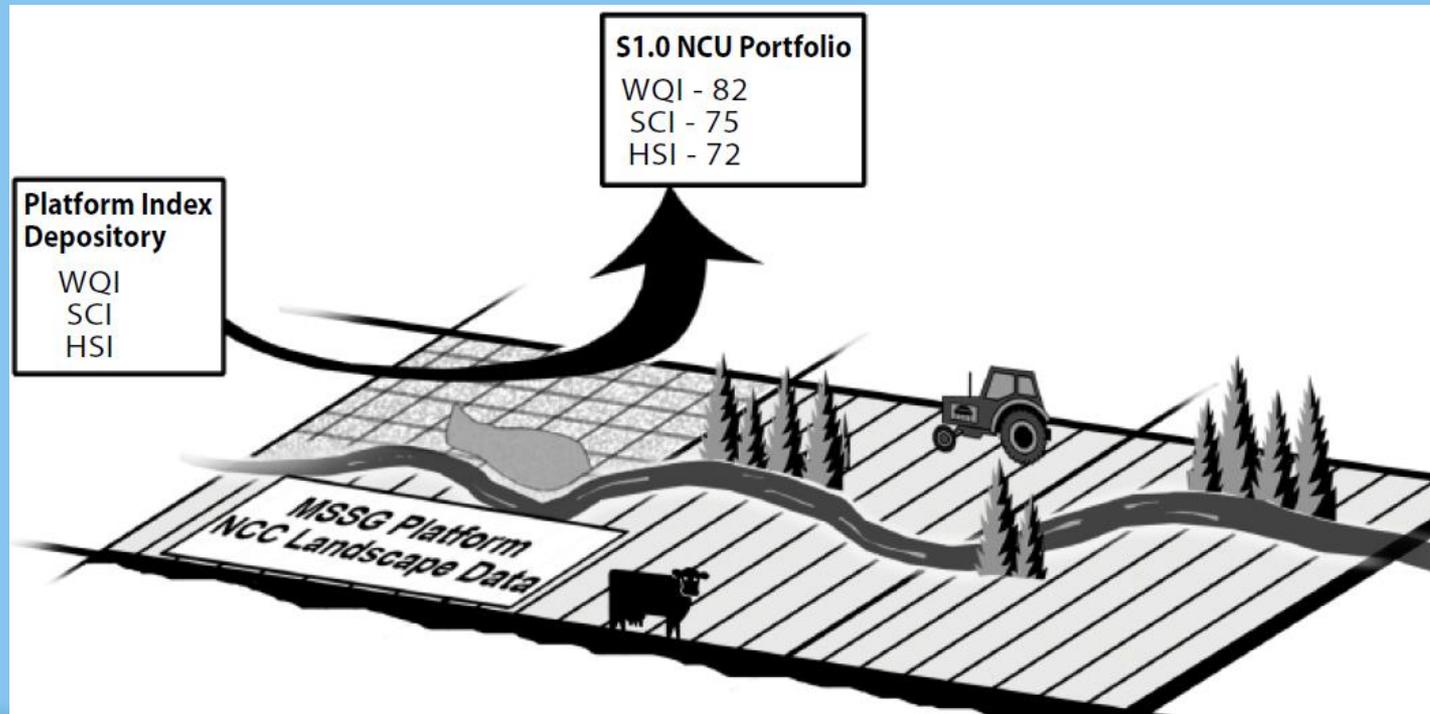
	Excludable	Non-Excludable
Rival	Private Goods	Common Goods
Non-Rival	Club Goods	Public Goods



Ecosystem Services can be categorized as NCU 1.0, 1.5, and 2.0

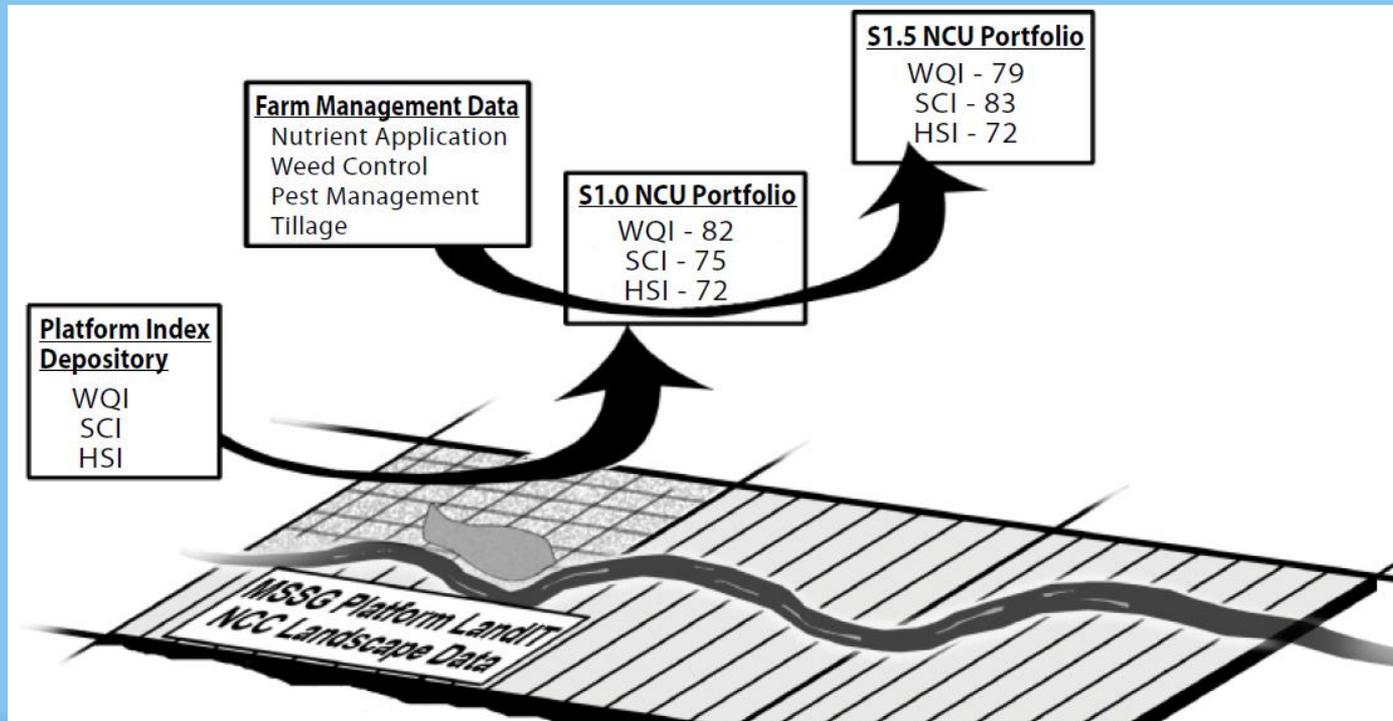
NCU 1.0 Club Good

Excludable (platform managers) and non-rival (multiple, not limited)
Remotely sensed (**outcome**)
Baseline; superficial qualities
Generated by Platform Managers
Relatively low value
Customers: Platform stakeholders



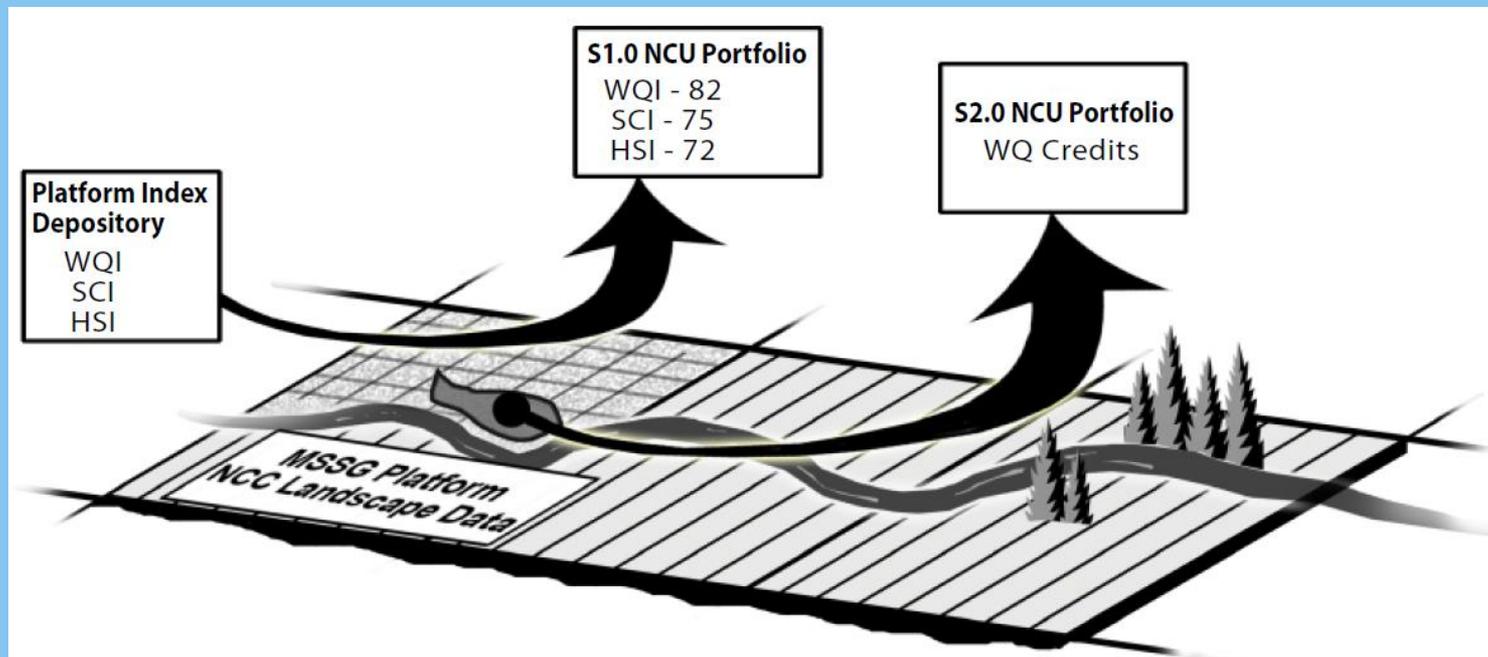
NCU 1.5 Club Good

Excludable (land manager) and non-rival (multiple, but limited)
NCU 1.0 data plus land management data (**outcome**)
Generated by Platform and Land Manager
Higher values
Customers: Sustainability Supply Chain, Utilities, etc.
[Private Good under some circumstances]

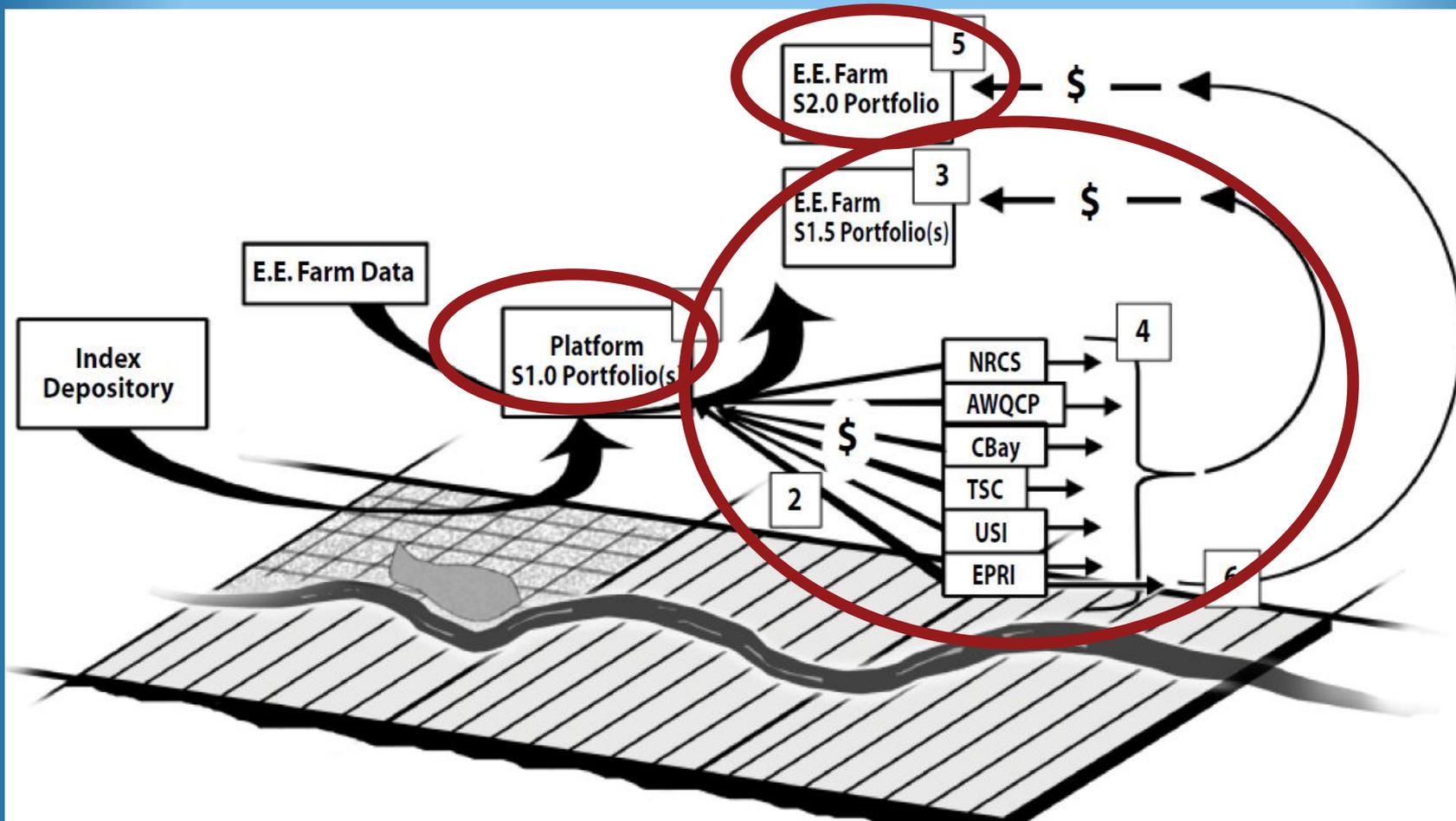


NCU 2.0 Private Good

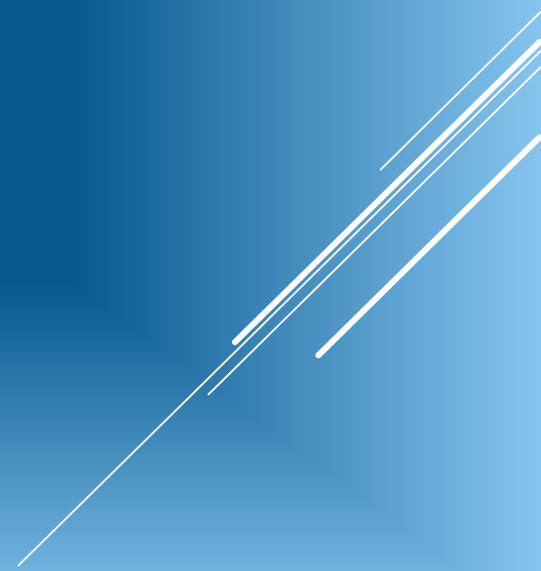
Excludable (Land Manager) and rival (single owner)
Ecosystem Service Credits (**output**)
Generated by Land Manager and Platform
Highest values
Customers: Mitigation, Direct users (utilities), Projects



E.E. Farm's NCU Portfolios



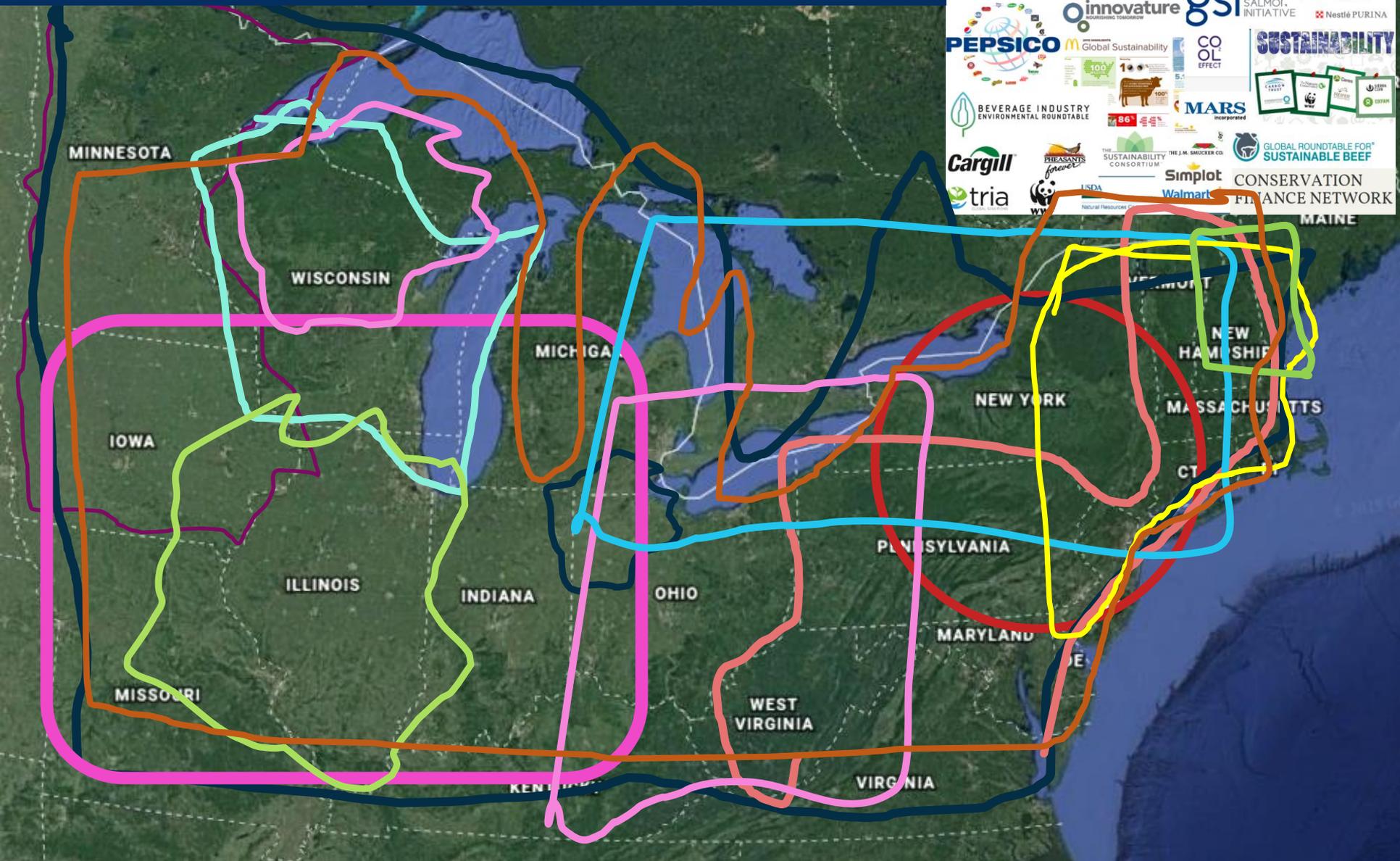
Questions on Club and Private Goods?



What Does a Transaction Look Like?

- Buyers Identify Sustainability Context (geography and parameters)
 - Sellers identify NCC and NCUs
 - Match-making of potential buyers and seller
 - Parties identify the supply of NCU 1.0, 1.5 and/or NCU 2.0
 - Negotiate and/or Accept Offers
- 
- A decorative graphic consisting of several parallel white lines of varying lengths, slanted upwards from left to right, located in the bottom right corner of the slide.

Demanders identify context relative to geography and parameters

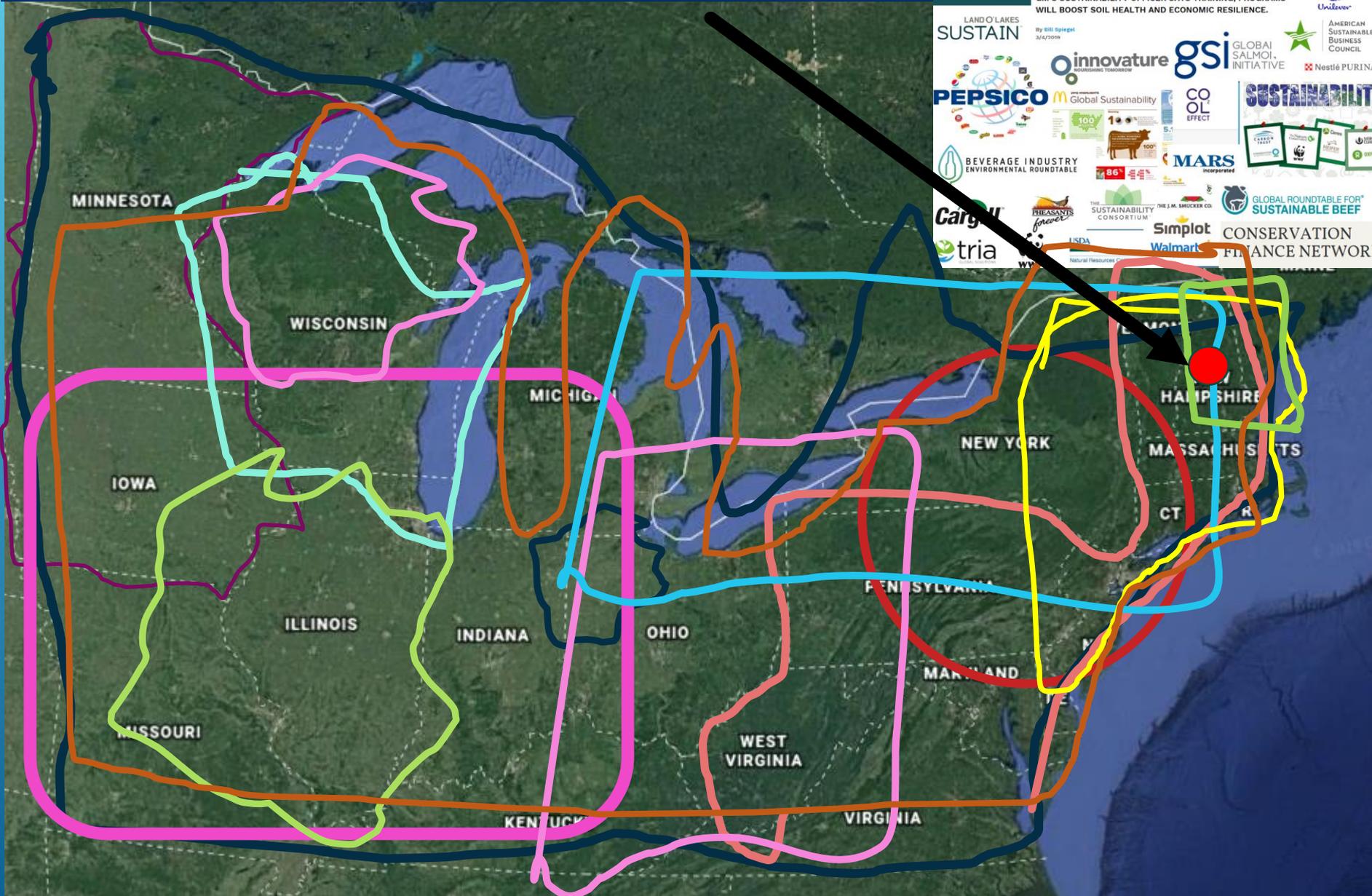


Suppliers Identify NCCs and NCU



SELLER			
Farm#5	ES NCU	#NCC	Offer
Field.B7	SCI	45	
Field.B7	WQI	45	
Field.B7	CSI	45	
Field.B7	GWI	45	

Platform Matchmaking



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PEPSICO Global Sustainability

innovature **gsi** GLOBAL SALMON INITIATIVE

MARS incorporated

COOL EFFECT

SUSTAINABILITY

CONSERVATION FINANCE NETWORK

Simplot **Walmart**

GLOBAL ROUNDTABLE FOR SUSTAINABLE BEEF

AMERICAN SUSTAINABLE BUSINESS COUNCIL

NESTLE PURINA

BEVERAGE INDUSTRY ENVIRONMENTAL ROUNDTABLE

Cargill **tria**

PHEASANTS FORECAST **THE SUSTAINABILITY CONSORTIUM** **THE J.M. SMOCKER CO.**

USDA **Natural Resources**

EcoCommerce Model

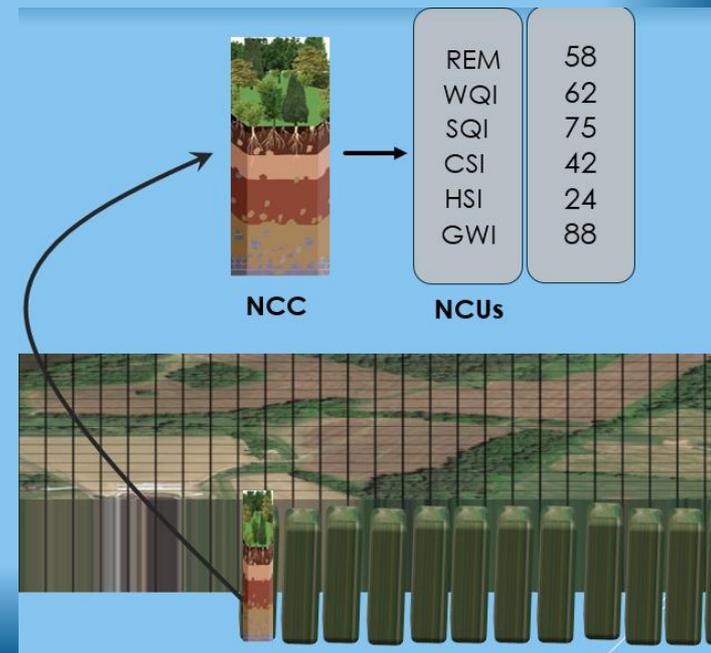


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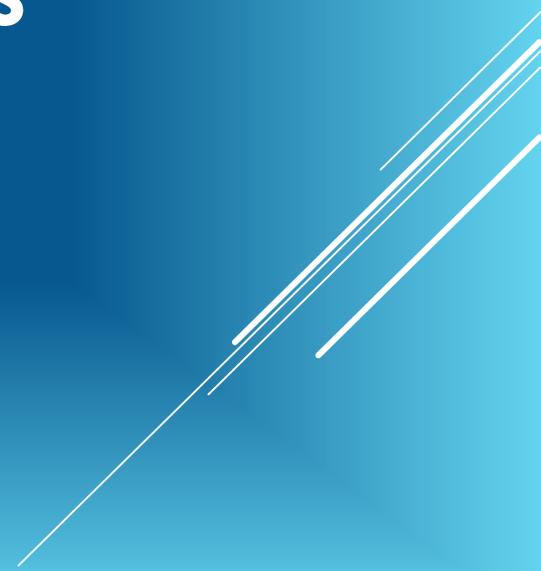
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TNC	WQI	8K	.22
TNC	CSI	30M	.22
VT	HDI	25K	.09
VT	GWI	320K	.10
....			
....			
....			

Information technologies are able to track each NCC and multiple NCU transactions

- Platform Index Depository (Standard and Customized)
- Set Limits on number of NCU 1.5 Club Good sales by sector
- Tracks and accounts for NCC status and progress
- Maintains NCU Portfolios
- Facilitates NCU Transaction



Questions on Transactions - Connecting Buyers and Sellers?



Steps to Creating an EcoCommerce® Ecosystem

Create a Collaboration that becomes a market proto-type

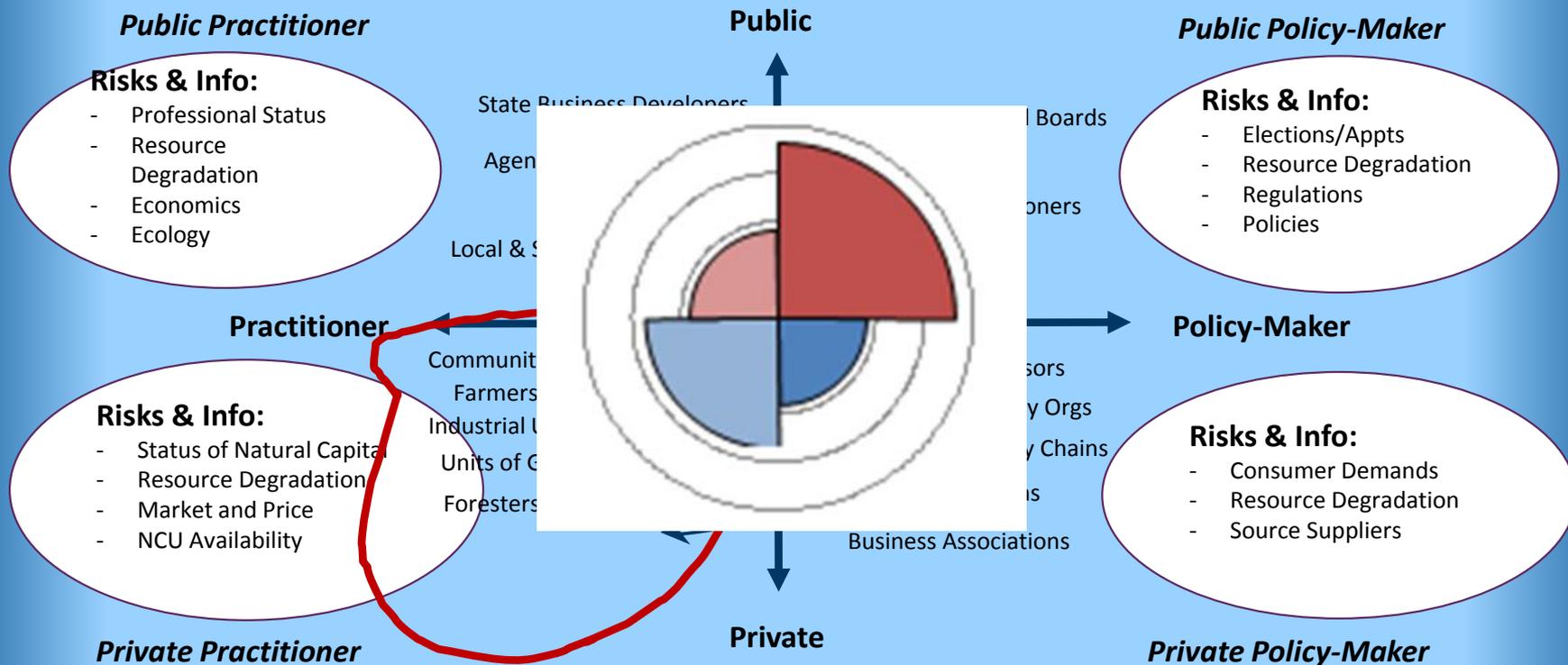
Develop a Minimal Viable Platform that supports a single transaction

Build the Platform that supports a EcoCommerce Ecosystem

Invite various stakeholders to occupy market ecosystem niches



Collaborative Governance Actors



EcoCommerce® Market Potentials

NCUs - Land Management 9m x 9m NCCs



Natural Capital Accounting

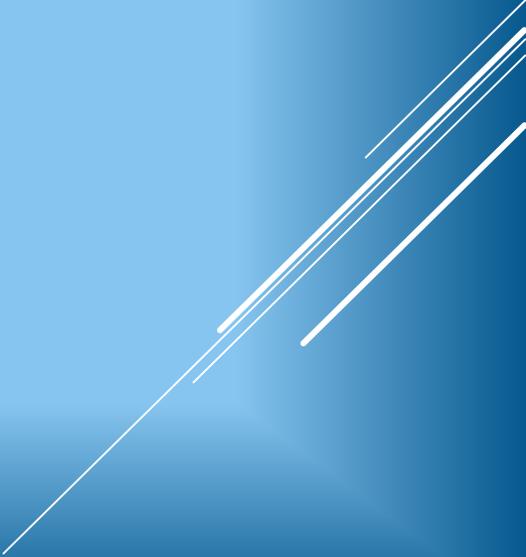
IASB International Accounting Standards Board	IFAC International Federation of Accountants	IMA Institute of Management Accountants	IIA Institute of Internal Auditors	IIRC International Integrated Reporting Council	TCFD ^{Task} Force on Climate-related Financial Disclosures
IAASB International Auditing and Assurance Standards Board	FASB Financial Accounting Standards Board	AICPA American Institute of Certified Public Accountants	CIIA Chartered Institute of Internal Auditors	GRI Global Reporting Initiative	CDSB Climate Disclosure Standards Board
IFIAR International Forum of Independent Audit Regulators	ACCA Association of Chartered Certified Accountants	CIMA Chartered Institute of Management Accountants	CIPFA Chartered Institute of Public Finance and Accountancy	SASB Sustainability Accounting Standards Board	CDP Carbon Disclosure Project

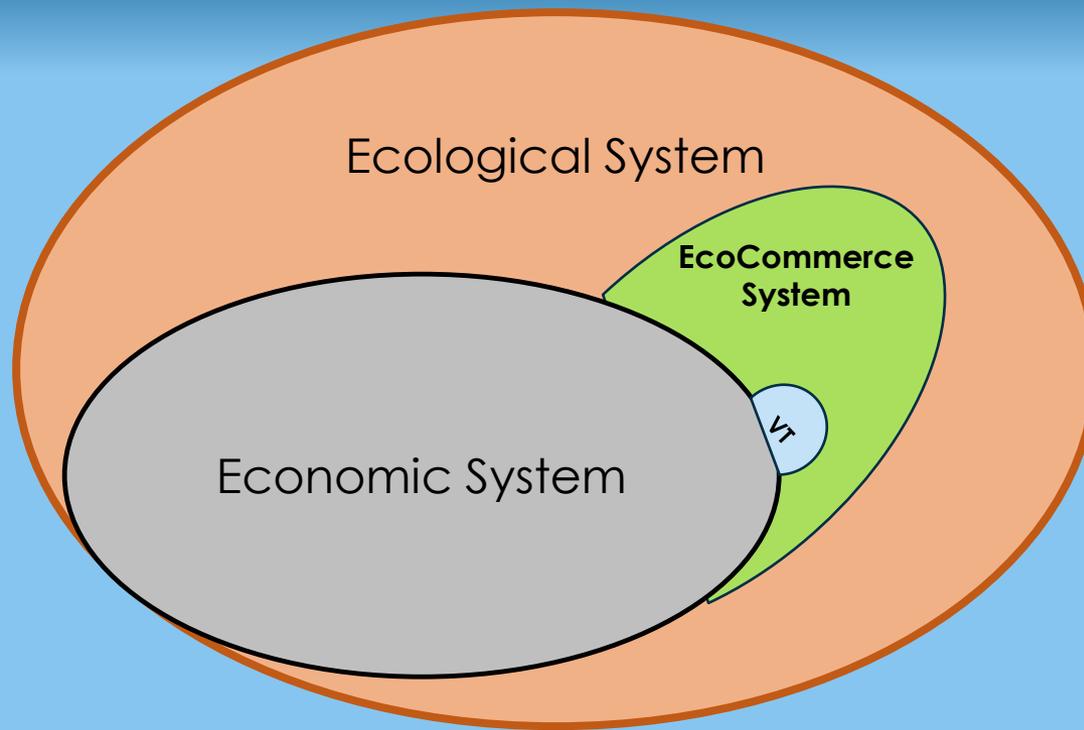
Government Agencies – Watershed Management



NCC Appreciation via NCUs - Investors

EcoCommerce Business Models

- Farmer [Land owner] Cooperative
 - Blockchain LLC
 - Single Entity, LLC
- 



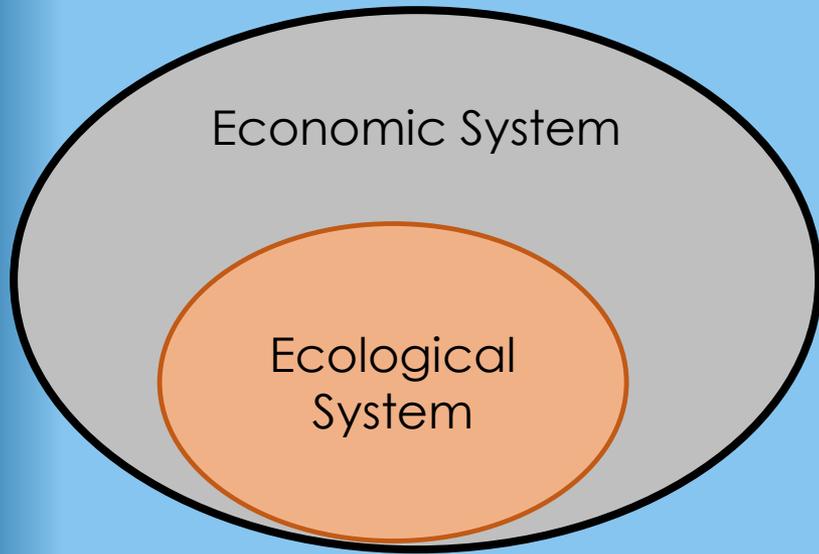
“EcoCommerce is more significant than a compilation or organization of eco-service markets, as it provides the framework to build an ecological intelligence system that allows the public arena of commerce to define sustainability.”

Jerry L. Hatfield
National Laboratory for Agriculture and the Environment
Ames, Iowa

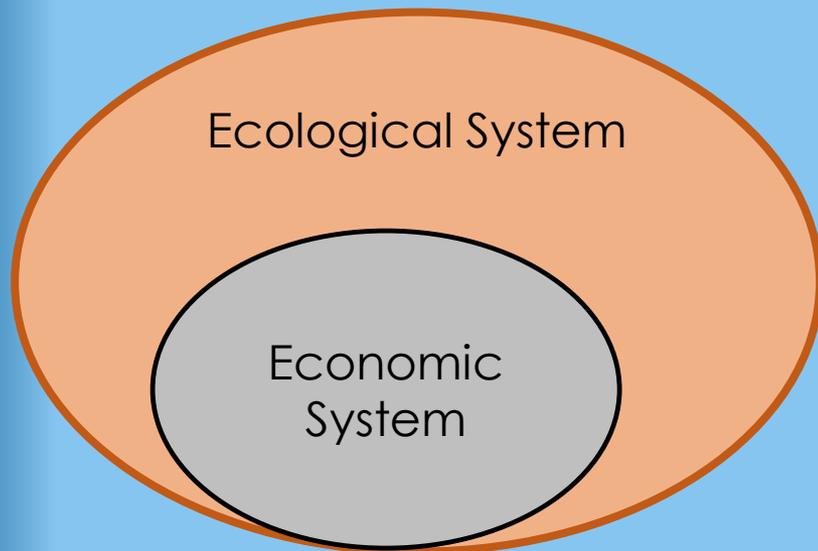
Questions on Creating an EcoCommerce[®] Ecosystem



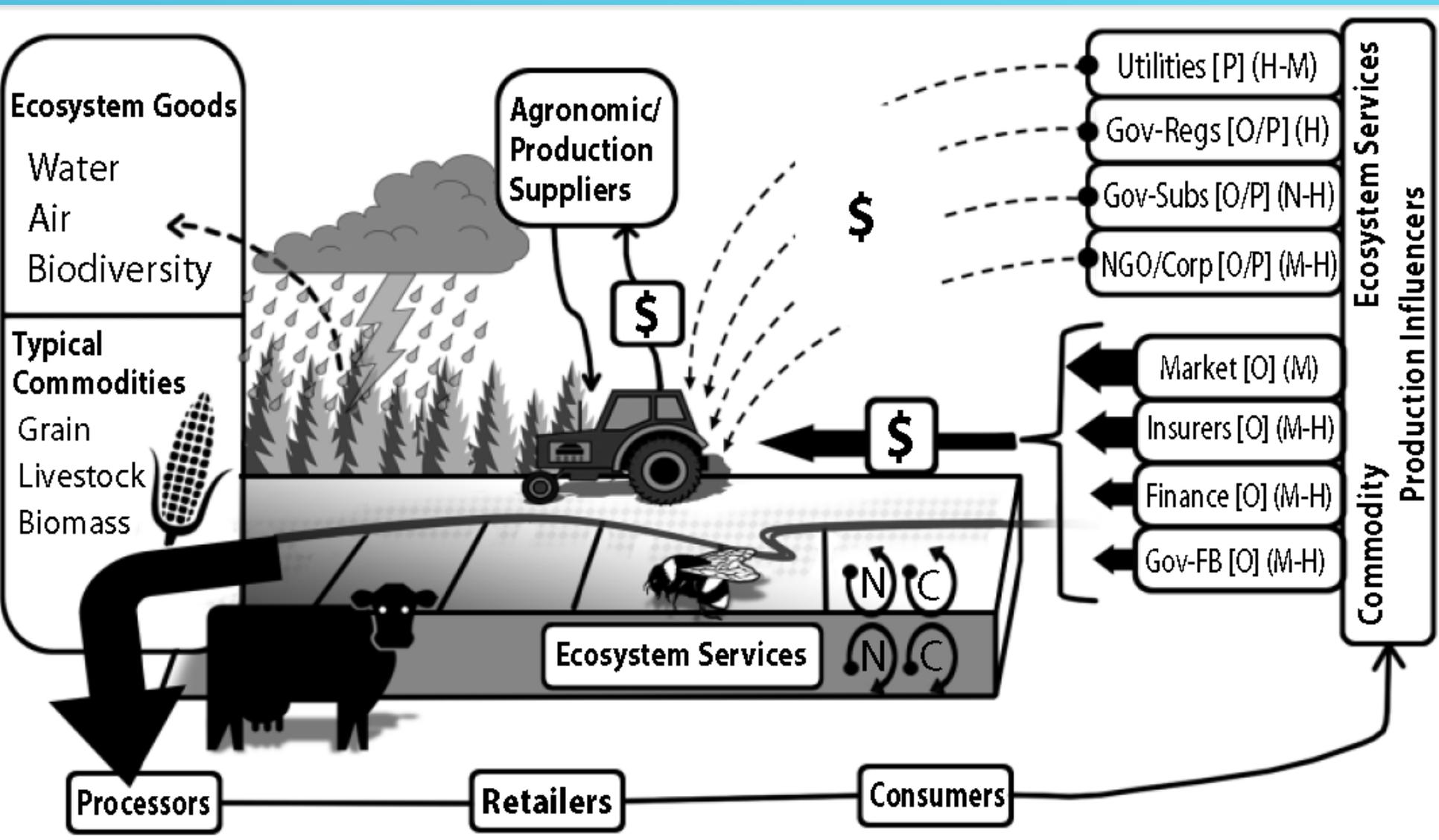
Tim Gieseke tim@agrslc.com

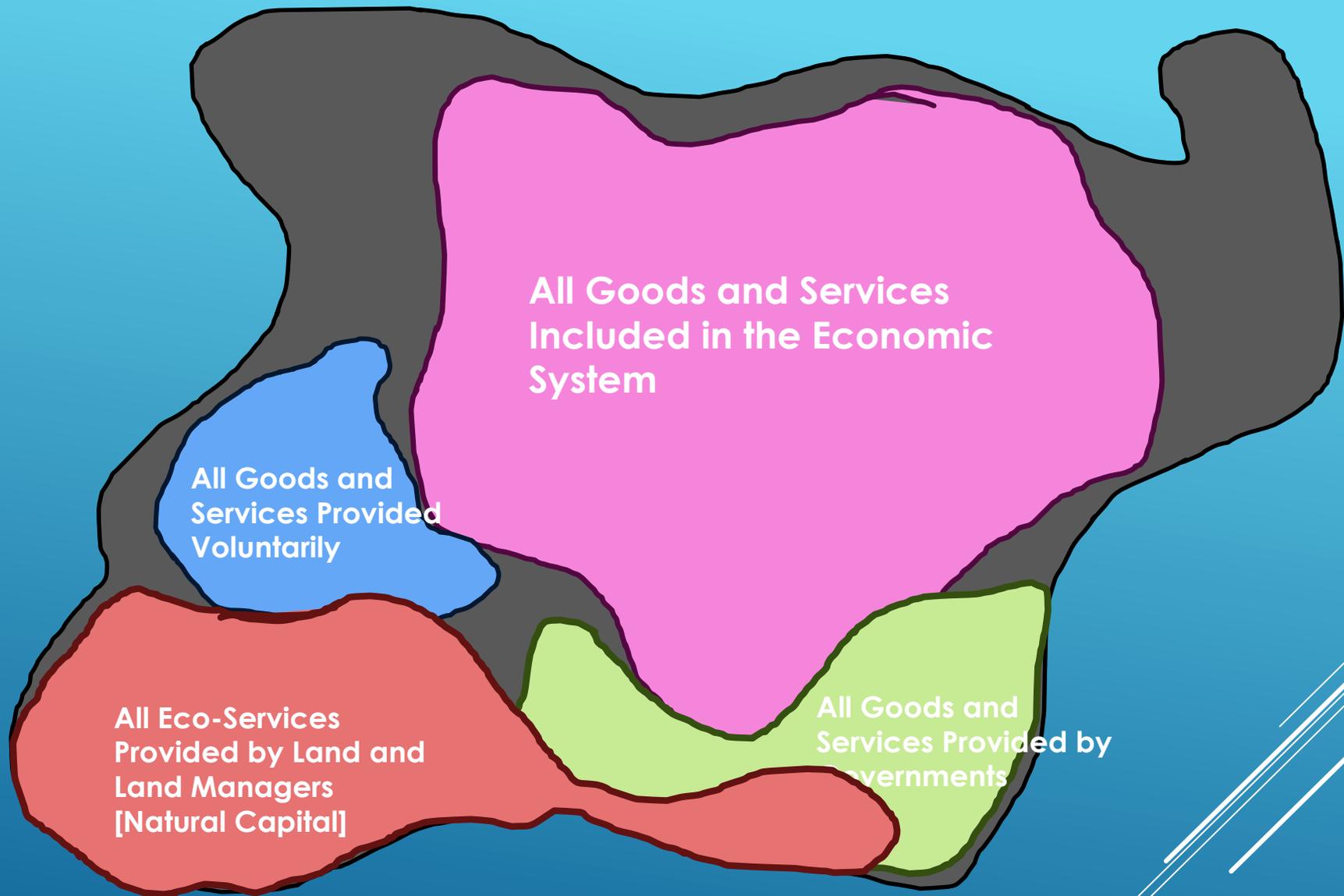


Is the Ecological System a subset of the Economic System?



Is the Economic System a subset of the Ecological System?





All Goods and Services
Included in the Economic
System

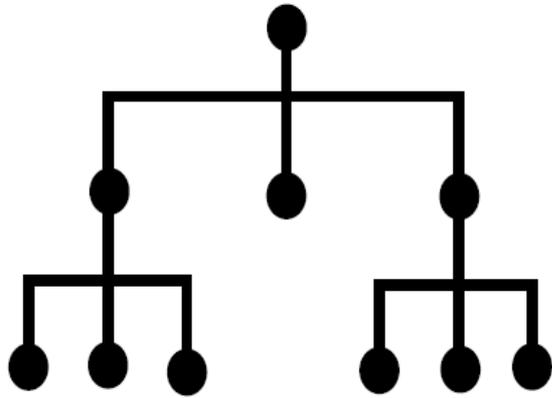
All Goods and
Services Provided
Voluntarily

All Eco-Services
Provided by Land and
Land Managers
[Natural Capital]

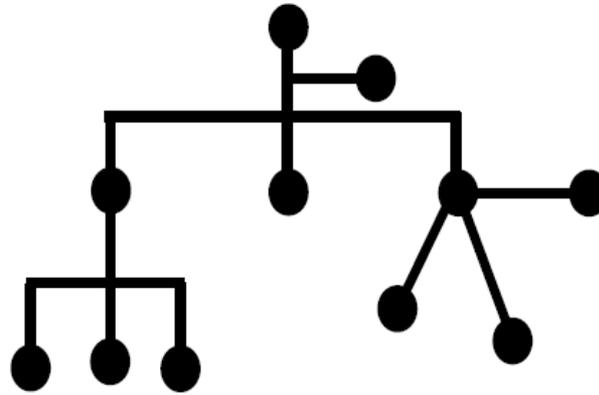
All Goods and
Services Provided by
Governments



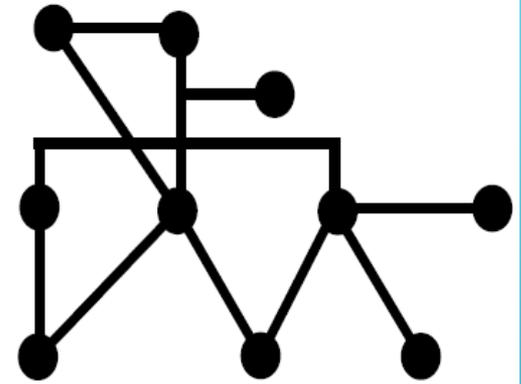
Hierarchy



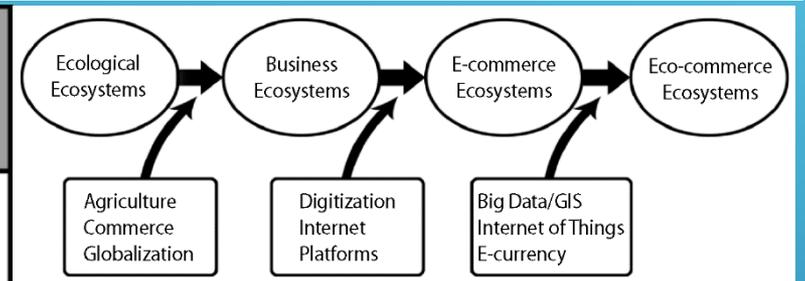
Market



Network



	Values		
Knowledge	Consensus	Disagreement	
Consensus	Technical	Political	
Disagreement	Scientific	Wicked	



The only thing scarier than a big problem is a solution to that problem

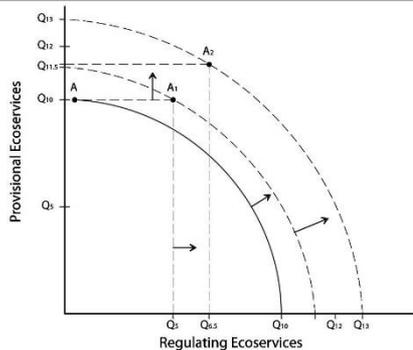


Figure 3.4 Kimball's Integrated Production Possibility Frontier



Brian Chesky

@bchesky

Follow

Marriott wants to add 30,000 rooms this We will add that in the next 2 weeks.

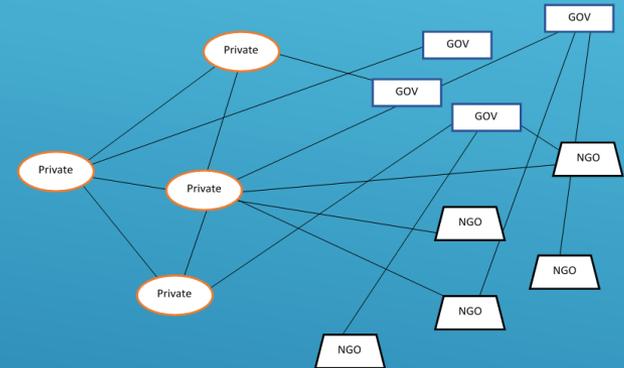
8:11 PM - 10 Jan 2014

284 Retweets 244 Likes



Networks *fundamentally* change the way people interact

To find parties who know the land owners and have “equity in the conversation” could be a scalable solution to working to meet the journey of continuous improvement’s requirements.



How we develop relationships

How we conduct commerce

How we obtain information

How we work with machines and objects

How organizations are structured

How society communicates

What Type of Issue is it?

Knowledge \ Values	Consensus	Disagree
	Consensus	Disagree
Consensus	Technical	
Disagree	Scientific	



* Rittel and Webber (1973)

Re-Think

What Makes a Problem Wicked?

A system with:

t **Technical and Scientific Data** ... in

...with system users and stakeholders that use different
method **Social and Economic Values** inputs, outputs
and outcomes of a system...

...that are from organizations that have dispersed
governance frameworks **Organizational Structures and Processes**
me **Organizational Structures and Processes** for the varied inputs,
outputs and outcomes of the system.